

AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

1. (original) A cellulose mixed ester having the following properties:
 - a total degree of substitution per anhydroglucose unit of from about 3.08 to about 3.50, having the following substitutions:
 - a degree of substitution per anhydroglucose unit of hydroxyl of no more than about 0.70,
 - a degree of substitution per anhydroglucose unit of C₃-C₄ esters from about 0.80 to about 1.40, and
 - a degree of substitution per anhydroglucose unit of acetyl of from about 1.20 to about 2.34;
 - an inherent viscosity of from about 0.05 to about 0.15 dL/g, as measured in a 60/40 (wt./wt.) solution of phenol/tetrachloroethane at 25 °C;
 - a number average molecular weight (M_n) of from about 1,000 to about 5,600;
 - a weight average molecular weight (M_w) of from about 1,500 to about 10,000; and
 - a polydispersity of from about 1.2 to about 3.5.
2. (original) The cellulose mixed ester according to claim 1, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in propylene glycol monomethyl ether.
3. (original) The cellulose mixed ester according to claim 1, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in propylene glycol methyl acetate.

4. (original) The cellulose mixed ester according to claim 1, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in diethylene glycol methyl ether.

5. (original) The cellulose mixed ester according to claim 1, wherein the C₃-C₄ ester comprises propionyl.

6. (original) The cellulose mixed ester according to claim 1, wherein the degree of substitution per anhydroglucose unit of hydroxyl is from about 0.05 to about 0.70.

7. (original) The cellulose mixed ester according to claim 1 wherein the inherent viscosity is from about 0.05 to about 0.12 dL/g, as measured in a 60/40 (wt./wt.) solution of phenol/tetrachloroethane at 25 °C.

8. (original) The cellulose mixed ester according to claim 1, wherein the number average molecular weight (M_n) is from about 1,500 to about 5,000.

9. (original) The cellulose mixed ester according to claim 1, wherein the polydispersity is from 1.2 to 2.5.

10. (original) The cellulose mixed ester according to claim 1, wherein the inherent viscosity is from 0.07 to 0.11 dL/g.

11. (original) The cellulose mixed ester according to claim 1, wherein the number average molecular weight (M_n) is from about 1,000 to about 4,000.

12. (original) The cellulose mixed ester according to claim 1, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester exhibits a viscosity no greater than 6,000 centipoise as a 50 wt.% solution in a 90/10 by weight mixture of n-butyl acetate/xylene.

13. (original) The cellulose mixed ester according to claim 1, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester exhibits a viscosity no greater than 3,000 centipoise as a 50 wt.% solution in a 90/10 by weight mixture of n-butyl acetate/xylene.

14. (original) A cellulose mixed ester having the following properties:

a total degree of substitution per anhydroglucose unit of from about 3.08 to about 3.50, having the following substitutions:

a degree of substitution per anhydroglucose unit of hydroxyl of no more than about 0.70;

a degree of substitution per anhydroglucose unit of C₃-C₄ esters from about 1.40 to about 2.45, and

a degree of substitution per anhydroglucose unit of acetyl of from about 0.20 to about 0.80;

an inherent viscosity of from about 0.05 to about 0.15 dL/g, as measured in a 60/40 (wt./wt.) solution of phenol/tetrachloroethane at 25 °C;

a number average molecular weight (M_n) of from about 1,000 to about 5,600;

a weight average molecular weight (M_w) of from about 1,500 to about 10,000; and

a polydispersity of from about 1.2 to about 3.5.

15. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in C-11 ketone.

16. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in diisobutyl ketone.

17. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in propylene glycol monopropyl ether.

18. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in ethylene glycol monopropyl ether.

19. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in ethylene glycol monobutyl ether.

20. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in methanol.

21. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in ethanol with 5% water, containing methanol, methyl isobutyl ketone, and ethyl acetate as denaturants.

22. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in toluene.

23. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in a 90/10 by weight isopropyl alcohol/ water blend.

24. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises propionyl.

25. (original) The cellulose mixed ester according to claim 14, wherein the degree of substitution per anhydroglucose unit of hydroxyl is from about 0.05 to about 0.70.

26. (original) The cellulose mixed ester according to claim 14, wherein the inherent viscosity is from about 0.05 to about 0.12 dL/g, as measured in a 60/40 (wt./wt.) solution of phenol/tetrachloroethane at 25 °C.

27. (original) The cellulose mixed ester according to claim 14, wherein the number average molecular weight (M_n) is from about 1,500 to about 5,000.

28. (original) The cellulose mixed ester according to claim 14, wherein the polydispersity is from 1.2 to 2.5.

29. (original) The cellulose mixed ester according to claim 14, wherein the inherent viscosity is from 0.07 to 0.11 dL/g.

30. (original) The cellulose mixed ester according to claim 14, wherein the number average molecular weight (M_n) is from about 1,000 to about 4,000.

31. (original) The cellulose mixed ester according to claim 14, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester exhibits a viscosity no greater than about 500 centipoise as a 50 wt.% solution in a 90/10 by weight mixture of n-butyl acetate/xylene.

32. (original) A cellulose mixed ester having the following properties:

a total degree of substitution per anhydroglucose unit of from about 3.08 to about 3.50, having the following substitutions:

a degree of substitution per anhydroglucose unit of hydroxyl of no more than about 0.70;

a degree of substitution per anhydroglucose unit of C₃-C₄ esters from about 2.11 to about 2.91, and

a degree of substitution per anhydroglucose unit of acetyl of from about 0.10 to about 0.50;

an inherent viscosity of from about 0.05 to about 0.15 dL/g, as measured in a 60/40 (wt./wt.) solution of phenol/tetrachloroethane at 25 °C;

a number average molecular weight (M_n) of from about 1,000 to about 5,600;

a weight average molecular weight (M_w) of from about 1,500 to about 10,000; and

a polydispersity of from about 1.2 to about 3.5.

33. (original) The cellulose mixed ester according to claim 32, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in methanol.

34. (original) The cellulose mixed ester according to claim 32, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in ethanol with 5% water, containing methanol, methyl isobutyl ketone, and ethyl acetate as denaturants.

35. (original) The cellulose mixed ester according to claim 32, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in toluene.

36. (original) The cellulose mixed ester according to claim 32, wherein the C₃-C₄ ester comprises butyryl, and wherein the cellulose mixed ester forms a clear solution as a 10 weight percent mixture in a 90/10 (by weight) isopropyl alcohol/ water blend

37. (original) The cellulose mixed ester according to claim 32, wherein the C₃-C₄ ester comprises propionyl.

38. (original) The cellulose mixed ester according to claim 32, wherein the degree of substitution per anhydroglucose unit of hydroxyl is from about 0.05 to about 0.70.

39. (original) The cellulose mixed ester according to claim 32, wherein the inherent viscosity is from about 0.05 to about 0.12 dL/g, as measured in a 60/40 (wt./wt.) solution of phenol/tetrachloroethane at 25 °C.

40. (original) The cellulose mixed ester according to claim 32, wherein the number average molecular weight (M_n) is from about 1,500 to about 5,000.

41. (original) The cellulose mixed ester according to claim 32, wherein the polydispersity is from 1.2 to 2.5.

42. (original) The cellulose mixed ester according to claim 32, wherein the inherent viscosity is from 0.07 to 0.11 dL/g.

43. (original) The cellulose mixed ester according to claim 32, wherein the number average molecular weight (M_n) is from about 1,000 to about 4,000.

44. (original) The cellulose mixed ester according to claim 32, wherein the C_3 - C_4 ester comprises butyryl, and wherein the cellulose mixed ester exhibits a viscosity no greater than about 200 centipoise as a 50 wt.% solution in a 90/10 by weight mixture of n-butyl acetate/xylene.

45. (original) A coating composition, comprising:

- a) the cellulose mixed ester according to claim 1;
- b) one or more coating resins; and
- c) one or more solvents.

46. (original) A coating composition, comprising:

- a) the cellulose mixed ester according to claim 14;
- b) one or more coating resins; and
- c) one or more solvents.

47. (original) A coating composition, comprising:

- a) the cellulose mixed ester according to claim 32;
- b) one or more coating resins; and
- c) one or more solvents.

48. (original) A coating composition comprising:

- a) about 0.1 to about 50 weight percent, based on the total weight of (a) and (b) in the coating composition, of the cellulose ester according to claim 1;
- b) about 50 to 99.9 weight percent, based on the total weight of (a) and (b) in the composition, of at least one resin selected from the group consisting of a polyester, a polyester-amide, a cellulose ester, an alkyd, a polyurethane, an epoxy resin, a polyamide, an acrylic, a vinyl polymer, a polyisocyanate, and a melamine; and
- c) at least one solvent;

wherein the total weight of (a) and (b) is from about 5 to about 85 weight percent of the total weight of (a), (b), and (c).

49. (original) The coating composition according to claim 48, further comprising about 0.1 to about 15 weight percent, based on the total weight of the composition, of one or more coatings additives selected from the group consisting of leveling, rheology, and flow control agents; flattening agents; pigment wetting and dispersing agents; surfactants; ultraviolet (UV) absorbers; UV light stabilizers; tinting pigments; defoaming and antifoaming agents; anti-settling, anti-sag and bodying agents; anti-skinning agents; anti-flooding and anti-floating agents; fungicides and mildewcides; corrosion inhibitors; thickening agents; or coalescing agents.

50. (original) A coating composition, comprising:

a) about 0.1 to about 50 weight percent, based on the total weight of (a) and (b) in the coating composition, of the cellulose mixed ester according to claim 14;

b) about 50 to 99.9 weight percent, based on the total weight of (a) and (b) in the composition, of at least one resin selected from the group consisting of a polyester, a polyester-amide, a cellulose ester, an alkyd, a polyurethane, an epoxy resin, a polyamide, an acrylic, a vinyl polymer, a polyisocyanate, and a melamine; and

c) at least one solvent;

wherein the total weight of (a) and (b) is from about 5 to about 85 weight percent of the total weight of (a), (b), and (c).

51. (original) The coating composition according to claim 50, further comprising about 0.1 to about 15 weight percent, based on the total weight of the composition, of one or more coatings additives selected from the group consisting of leveling, rheology, and flow control agents; flattening agents; pigment wetting and dispersing agents; surfactants; ultraviolet (UV) absorbers; UV light stabilizers; tinting pigments; defoaming and antifoaming agents; anti-settling, anti-sag and bodying agents; anti-skinning agents; anti-flooding and anti-floating agents; fungicides and mildewcides; corrosion inhibitors; thickening agents; or coalescing agents.

52. (original) The coating composition of claim 51, further comprising one or more fillers and/or pigments.

53. (original) The coating composition of claim 51, wherein the pigment is comprised of aluminum or mica.

54. (original) A shaped or formed article coated with the composition of claim 51.

55. (original) A pigment dispersion, comprising:

about 20 to about 50 weight percent by weight of a pigment; and
about 50 to about 80 percent by weight of the cellulose mixed ester of
claim 14.

56. (original) The pigment dispersion of claim 55, wherein the pigment is
comprised of alumina or mica.

57. (original) A radiation curable coating containing the cellulose mixed ester
according to claim 14.

58. (original) A powder coating containing the cellulose mixed ester according to
claim 14.

59. (original) An ink composition containing the cellulose mixed ester according
to claim 14.

60. (original) A plastic material coated with the composition according to
claim 51.

61. (original) A metal coated with the composition according to claim 51.

62. (original) A wood surface coated with the composition according to claim 51.

63. (original) A paper coated with the composition according to claim 51.

64. (original) The coating composition according to claim 45, wherein the one or
more solvents includes water.

65. (original) The coating composition according to claim 46, wherein the one or
more solvents includes water.

66. (original) The coating composition according to claim 47, wherein the one or more solvents includes water.

67. (new) A coating composition comprising:

a) about 0.1 to about 50 weight percent, based on the total weight of (a) and (b) in the coating composition, of the cellulose ester according to claim 32;

b) about 50 to 99.9 weight percent, based on the total weight of (a) and (b) in the composition, of at least one resin selected from the group consisting of a polyester, a polyester-amide, a cellulose ester, an alkyd, a polyurethane, an epoxy resin, a polyamide, an acrylic, a vinyl polymer, a polyisocyanate, and a melamine; and

c) at least one solvent;

wherein the total weight of (a) and (b) is from about 5 to about 85 weight percent of the total weight of (a), (b), and (c).

68. (new) The coating composition according to claim 67, further comprising about 0.1 to about 15 weight percent, based on the total weight of the composition, of one or more coatings additives selected from the group consisting of leveling, rheology, and flow control agents; flattening agents; pigment wetting and dispersing agents; surfactants; ultraviolet (UV) absorbers; UV light stabilizers; tinting pigments; defoaming and antifoaming agents; anti-settling, anti-sag and bodying agents; anti-skinning agents; anti-flooding and anti-floating agents; fungicides and mildewcides; corrosion inhibitors; thickening agents; or coalescing agents.

69. (new) The coating composition of claim 68, further comprising one or more fillers and/or pigments.

70. (new) The coating composition of claim 69, wherein the pigment is comprised of aluminum or mica.

71. (new) A shaped or formed article coated with the composition of claim 67.

72. (new) A pigment dispersion, comprising:
about 20 to about 50 weight percent by weight of a pigment; and
about 50 to about 80 percent by weight of the cellulose mixed ester of
claim 32.

73. (new) The pigment dispersion of claim 72, wherein the pigment is
comprised of alumina or mica.

74. (new) A radiation curable coating containing the cellulose mixed ester
according to claim 32.

75. (new) A powder coating containing the cellulose mixed ester according to
claim 32.

76. (new) An ink composition containing the cellulose mixed ester according to
claim 32.

77. (new) A plastic material coated with the composition according to claim 67.

78. (new) A metal coated with the composition according to claim 67.

79. (new) A wood surface coated with the composition according to claim 67.

80. (new) A paper coated with the composition according to claim 67.